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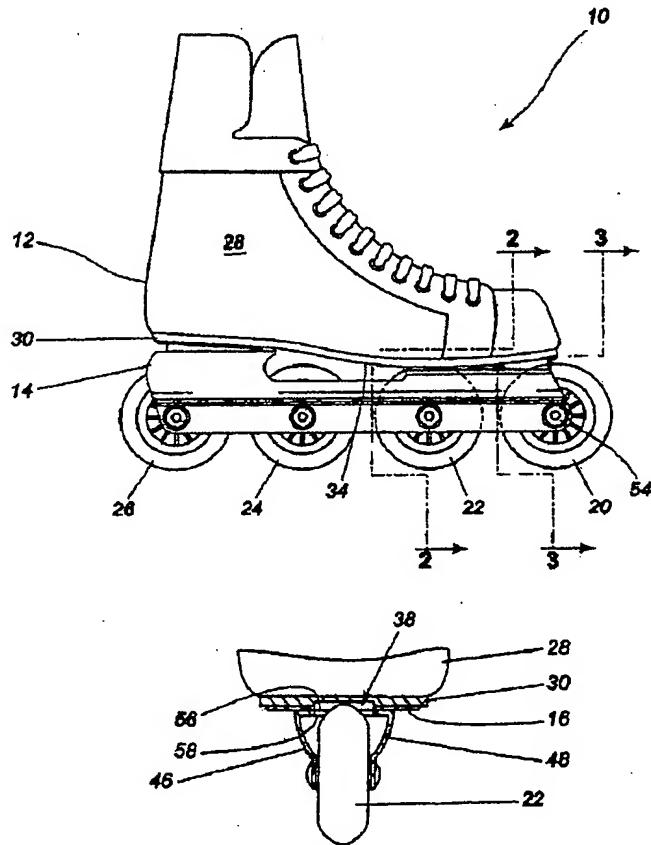
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(72) Inventeur/Inventor:  
CHIASSON, MICHEL J., CA  
(73) Propriétaire/Owner:  
BAUER NIKE HOCKEY INC., CA  
(74) Agent: SMART & BIGGAR

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(57) Abrégé/Abstract

An in-line roller skate with a sole including a recess for receiving the upper portion of one of the skate wheels. This arrangement allows to bring the wheels closer to the plantar surface of the foot to lower the centre of gravity of the skater.

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**ABSTRACT**

5 An in-line roller skate with a sole including a recess for receiving the upper portion of one of the skate wheels. This arrangement allows to bring the wheels closer to the plantar surface of the foot to lower the centre of gravity of the skater.

## IN-LINE ROLLER SKATE

### Field of the invention

5 The present invention relates to skates, particularly in-line roller skates designed to lower the centre of gravity of the skater by bringing the wheels closer to the plantar surface of the skater's foot.

### Background of the invention

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Over the past few years roller skating has greatly increased in popularity and the nature of the activity has changed. Skating has moved from indoor arenas specifically constructed for that purpose, to the streets, sidewalks and parks of modern urban centres. As such, skaters are no longer confined to a relatively dull oval path, but are generally free to travel outdoors to a destination, and along a course, of their choosing. This has allowed skating to become at once, an enjoyable leisure-time activity, an excellent means of exercise, and an economical method of transportation.

20 The transition, however, has at times not been a simple one. New outdoor skating environments do not have the smooth, level skating surfaces of a traditional skating rink nor are they necessarily free of debris. Each of these factors contributes to an increased level of difficulty for the activity. Skating outdoors further presents the skater with obstacles and hazards, such as cars, animals, and cyclists, all of which require him to have excellent stability and control while skating to avoid harm. These 25 changes in the venue and purpose of skating have therefore necessitated modifications to the design of the skates themselves in order to provide the skater with the control that he needs.

Increased control is among the reasons which have attributed to the current preference of skaters for in-line roller skates (those where the wheels all rotate within a single, generally vertical plane perpendicular to the longitudinal axis of the skate) as opposed to the old quad-wheeled, bi-axled skates. While such skates are better in this area than 5 their older counterparts, there still remains a need to impart the skater with more control over the skate. Such is especially true where the skates are being used in sports such as roller hockey, where skaters are required to make quick turns and stops at relatively high speeds.

10 It has been recognised that the closer the skater's centre of gravity is to the skating surface, the more stable the skater will be and the more control he will have over his motion, yet hereto skates have not been manufactured optimising this factor. Indeed, with the developing trend toward the use of wheels of increased diameter over those of the prior art, there has been a tendency to raise rather than lower the skater's centre 15 of gravity with respect to the skating surface.

#### Summary of the invention

Accordingly, the present invention provides a roller skate which provides the skater 20 with a lower centre of gravity as compared to prior art skates.

Another object of the invention is to provide a frame for a roller skate allowing to bring the wheels of the skate closer to the plantar surface of the skater's foot.

25 Yet, another object of the invention is a boot for a roller skate allowing to bring the wheels of the skate closer to the plantar surface of the skater's foot.

As embodied and broadly described herein the invention provides a roller skate comprising:

- at least one wheel for engaging a skating surface;
- a boot for receiving a foot of a skater, the boot including a sole having a recess, said recess, receiving a portion of said wheel therein.

5

Typically, the boot includes a vamp that covers the upper portion of the foot and a sole on which rests the plantar surface of the foot. The vamp may be made separately from the sole or a single unit with the sole. In the former case, the vamp may be constructed of several different materials stitched or otherwise attached together. The 10 assembly is then glued or stitched to the sole to complete the manufacture of the boot. In the latter case, when the sole is integrally formed with the vamp a method of manufacture by injection moulding is preferred.

15 The recess receiving the portion of the wheel can be created by forming an indentation, depression or aperture in the skating surface facing side of the sole which is capable of accommodating and receiving at least a portion of a wheel therein. Simple depressions are however preferred over complete apertures. While the exact dimensions of the recess will vary according to the amount by which it is desired to cause the wheel to penetrate into the sole, the dimensions must be such that the wheel 20 is capable of free rotation within the recess. The recess must be of such a shape such that at no time during the course of a complete revolution of the wheel the wheel contacts any portion of the sole while the skate is in use; no other particular shape is required. Preferably, the dimensions of the recess should be not greater than that which is necessary to allow for such rotation to occur (including any allowance for the 25 shifting of the wheel in the occurrence of a shock).

As embodied and broadly described herein the invention provides an in-line roller skate, comprising:

- a plurality of wheels mounted for rotation in a generally common plane;
- a boot for receiving a skater's foot, said boot holding and supporting the foot of the skater, said boot including a sole having a recess;
- 5 - a frame for supporting the wheels, said frame being mounted to said sole and having a pair of side rails extending generally along a longitudinal axis of said skate, said side rails being spaced apart and receiving said wheels therebetween; said frame including a bridging portion interconnecting said side rails, said bridging portion being located under a front portion of said boot; said bridging portion comprising a longitudinal recess registered with said recess of said boot wherein the juxtaposition of said recess of said boot with said longitudinal recess provides clearance for at least one of the wheels.
- 10

As embodied and broadly described herein, the invention further provides a frame for an in-line roller skate, said frame comprising:

- a pair of longitudinally extending side rails in a spaced apart relationship for receiving a plurality of wheels therein;
- a bridging portion interconnecting said side rails, said bridging portion including a recess therein whereby a wheel mounted to said frame projects through said recess and a portion of the wheel extends above said bridging portion.
- 20

In a preferred embodiment the frame of the in-line roller skate is separately manufactured and attached to the sole of the boot during the assembly operation of the skate. The bridging portion of the frame that connects the side rails is integrally formed with the rails and connected to the sole of the boot with rivets. The recess in the bridging portion is, most preferably, in the form of an aperture through which projects the wheel. That aperture, in turn, registers with a blind recess in the sole that receives the upper portion of the wheel. In a possible variant, the recess in the sole of

the boot can be omitted. In such cases, the wheel does not penetrate the sole and extends solely into the bridging portion. The recess in the bridging portion can be either an aperture or a blind recess such that when seen from the above the surface of the bridging portion appears uninterrupted. In a further variant, the bridging portion 5 can be integrated with the sole of the boot. Thus, instead of having two components that are attached to one another face to face a single component in the form of a structurally resistant sole is used that provides support for the foot and at the same time serves the function of interconnecting member for the side rails of the frame. Thus, the expression "bridging portion" as appearing in this specification and claims 10 should not be interpreted to mean exclusively a component separate from the sole of the boot as it also may encompass structures where the bridging member is integrated into the boot sole.

For the purposes of clarity of expression it should be noted that the word "recess" as 15 used herein is intended to designate either a depression in a surface "blind recess" or an aperture which extends completely through the structure comprising the recess. Also, "upwardly" refers to the direction, when the frame is in place on a roller skate, in which the wheels would have to be recessed in order to lower the skater's centre of gravity with respect to the skating surface. In this respect, "upwardly" would 20 generally be towards the foot of the skater, as distinguished from the skating surface.

#### Brief description of the drawings

The following is a description of a preferred embodiment, reference being made to the 25 following drawings, in which:

Figure 1 is a side elevational view of the skate constructed in accordance with the invention;

Figure 2 is a sectional view of the second wheel from the front of the skate;

30 Figure 3 is a sectional view of the wheel at the front of the skate;

Figure 4 is a perspective view of the skate frame, showing the boot attachment plates;  
Figure 5 is a bottom view of the boot, with the attachment plates affixed in place;  
Figure 6 is a bottom view of the boot, without the attachment plates;  
Figure 7 is a side cross-sectional view of the boot.

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#### Description of preferred embodiments

In the drawings, preferred embodiments of the invention are illustrated by way of example. It is to be expressly understood that the description and drawings are only for the purposes of illustration and as an aid to understanding, and are not intended as a definition of the limits of the invention. The scope of the invention is defined in the appended claims and their equivalents.

10 In Figure 1 there is shown an in-line roller skate 10 comprised of a boot 12, a set of wheels 20, 22, 24, 26, a frame 14 for supporting the wheels, and forward 16 and rear 18 attachment plates for securing the frame 14 to the boot 12.

15 The boot 12 may be constructed in accordance with any number of methods familiar to those skilled in the art. Preferably, the boot 12 includes a vamp 28 that encircles and confines the upper portion of the skater's foot and a sole 30. The vamp 28 is comprised of stitched together pieces of ballistic nylon and leather. The sole 30 may be formed from a variety of conventional materials, including leathers and plastics. 20 Alternatively, the boot may be constructed in accordance with an integral design wherein the vamp and the sole are fabricated as a single unit. A plastic moulded boot 25 is an example of such a design. Under this form of construction the upper part of the vamp 28, a so called cuff may be connected to the lower part of the vamp through a pivotal joint allowing the skater to easily bend forward and backward its leg. This arrangement facilitates the skating manoeuvres. Moreover, it allows use on the skate

of a brake system that is operated by tilting the leg backwards. Such brake system will not be described since it does not form part of the present invention.

5 The sole 30 includes a skating surface facing side 34 and an upper section facing side for receiving and supporting the plantar surface of the skater's foot. The sole 30 is attached to the bottom portion of the boot along the upper section facing side 32. While stitching (not shown) is the preferred method of such attachment, any other conventional method of attachment may be used, such as adhesives and rivets, among others.

10

Secured to the skating surface side 34 of the sole 30 are forward and rear attachment plates 16 and 18 respectively. The attachment plates are preferably constructed of plastics material, however they may also be constructed of lightweight metals such as aluminium. Such plates as shown in Fig. 4 are thus generally comprised of two portions: a peripheral portion 38f and 38r of a shape so as to be capable of conforming with the skating surface side 34 of the sole 30, and a planar portion 40f and 40r. The peripheral portion 38r of attachment plate 18 is generally flat and it engages the heel portion of the sole. In contrast, the peripheral portion 38f of attachment plate 16 is gently curved to conform to the curvature at the front of the sole where it receives the ball of the foot. The attachment plates 16 and 18 are affixed to the sole 30 by means 20 of a plurality of rivets 42 in the peripheral portions 38f and 38r.

25 Frame 14 for supporting the wheels is secured to the attachment plates 16 and 18 in any convenient manner such as mechanical fasteners or adhesive. As seen in Figs. 2, 3 and 4, the frame is generally U-shaped, being comprised of two side rails 46 and 48 that are generally parallel and run along the longitudinal axis of the skate. The rails 46 and 48 are in a spaced apart relationship connected by forward 50 and rear 52 bridging portions. The bridging portions 50 and 52 are planar and mate with the planar portions 40f and 40r of the attachment plates 16 and 18.

The side rails 46 and 48 are provided with a plurality of apertures 54 in a spaced apart relationship and adapted to receive and support a plurality of wheel axles (not shown).  
5 The wheels 20, 22, 24, 26 are each supported on an individual axle which is in turn received by an aperture 54. The axles are secured to the frame 14 within the apertures 54 by any number of conventional means, and the wheels 20, 22, 24, 26 are thus supported by the frame 14 for rotation on a skating surface (not shown).

As illustrated in Figs. 2 to 7, the frame 14, the forward attachment plate 16, and the  
10 sole 30 are each provided with recesses 58, 56, and 38 respectively enabling the second forward most wheel 22 to be recessed therein. The recesses 58 and 56 are apertures while the recess 38 is a blind recess. As further illustrated in Figs. 2 to 7, the frame 14 and forward attachment plate 16 are also each provided with recesses (apertures) 62 and 60 respectively enabling the forward most wheel 20 to be recessed  
15 therein. The recesses 58, 56, 38, 62 and 60 register with the respective wheels and are dimensioned in such a way as to avoid any contact with the rotating wheel surfaces.

When the skate is assembled the second forward most wheel is received in the recesses 58, 56 and 38. The upper portion of the wheel projects beyond the bridging  
20 portion 50 and the portion 40f of the attachment plate 16 and it is then received in the blind recess 38. The same arrangement is obtained with the forward most wheel where it projects beyond the bridging portions 50 and the recess portion 40f. The forward most wheel, however, does not penetrate the sole 30.

25 The advantage of this arrangement is to bring the extremities of the foremost wheels in close proximity to the plantar surface of the foot. As a result, the centre of gravity of the skater is lowered which enables to provide increased control levels.

Under a possible variant, the attachment plates 16 and 18 are integrally formed with

the bridging portions 50 and 52, respectively. This form of construction presents the advantage of a unitary frame piece which connects directly to the sole of the boot without any intermediate components. A frame structure like this can be easily manufactured from plastics material by injection moulding. On the other hand, if it is desired to use a frame made from metallic material, such as aluminium which is the material of choice in roller skates used by professionals or highly skilled athletes the preferred form of construction remains as described earlier since it may be difficult to form the attachment plates integrally with the metallic frame. In a further variant, the sole of the boot including the attachment plates 16 and 18 along with the bridging portions 50 and 52 can be made as one unit.

**THE EMBODIMENTS OF THE INVENTION FOR WHICH AN EXCLUSIVE  
PRIVILEGE OR PROPERTY IS CLAIMED ARE DEFINED AS FOLLOWS:**

5 1. An in-line roller skate comprising:

- a plurality of wheels mounted for rotation in a generally common plane;
- a boot for receiving, holding and supporting a skater's foot; said boot including a sole having a recess;
- a frame for supporting the wheels, said frame being mounted to said sole and having a pair of side rails extending generally along a longitudinal axis of said skate, said side rails being spaced apart and receiving said wheels therebetween; said frame including a bridging portion interconnecting said side rails, said bridging portion being located under a front portion of said boot;
- said bridging portion comprising a longitudinal recess registering with said recess of said boot wherein the juxtaposition of said recess of said boot with said longitudinal recess provides clearance for at least one of the wheels.

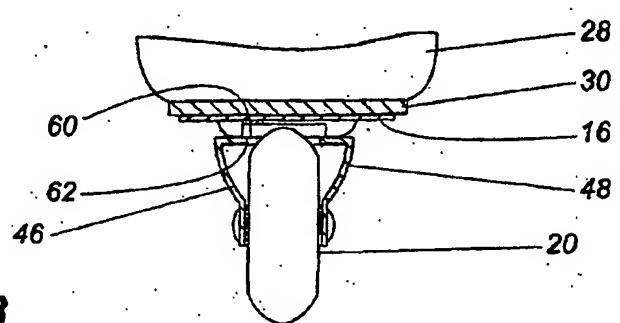
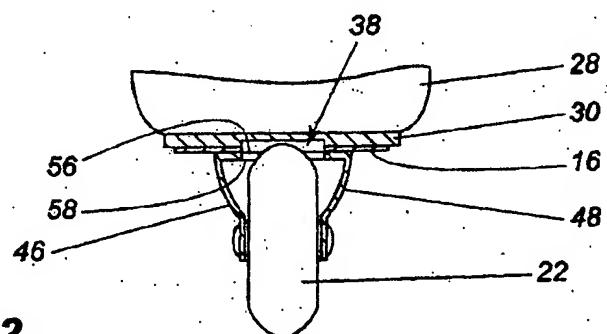
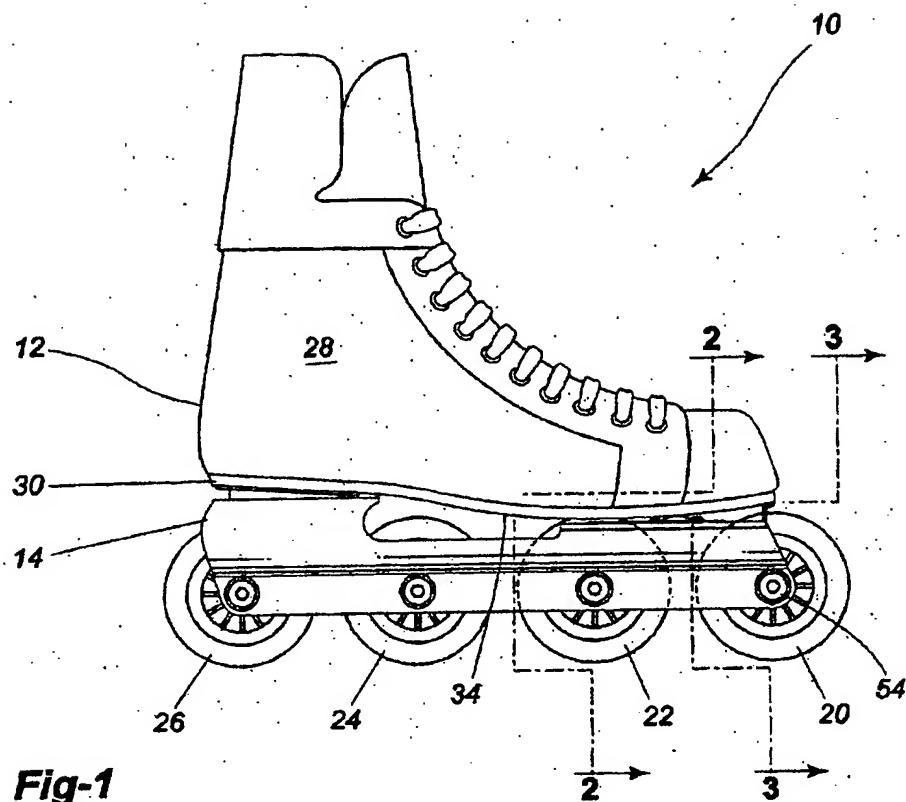
20 2. An in-line roller skate as defined in claim 1 wherein said in-line roller skate comprises at least four wheels; said recess of said sole and said longitudinal recess registering with the second forward most wheel therein.

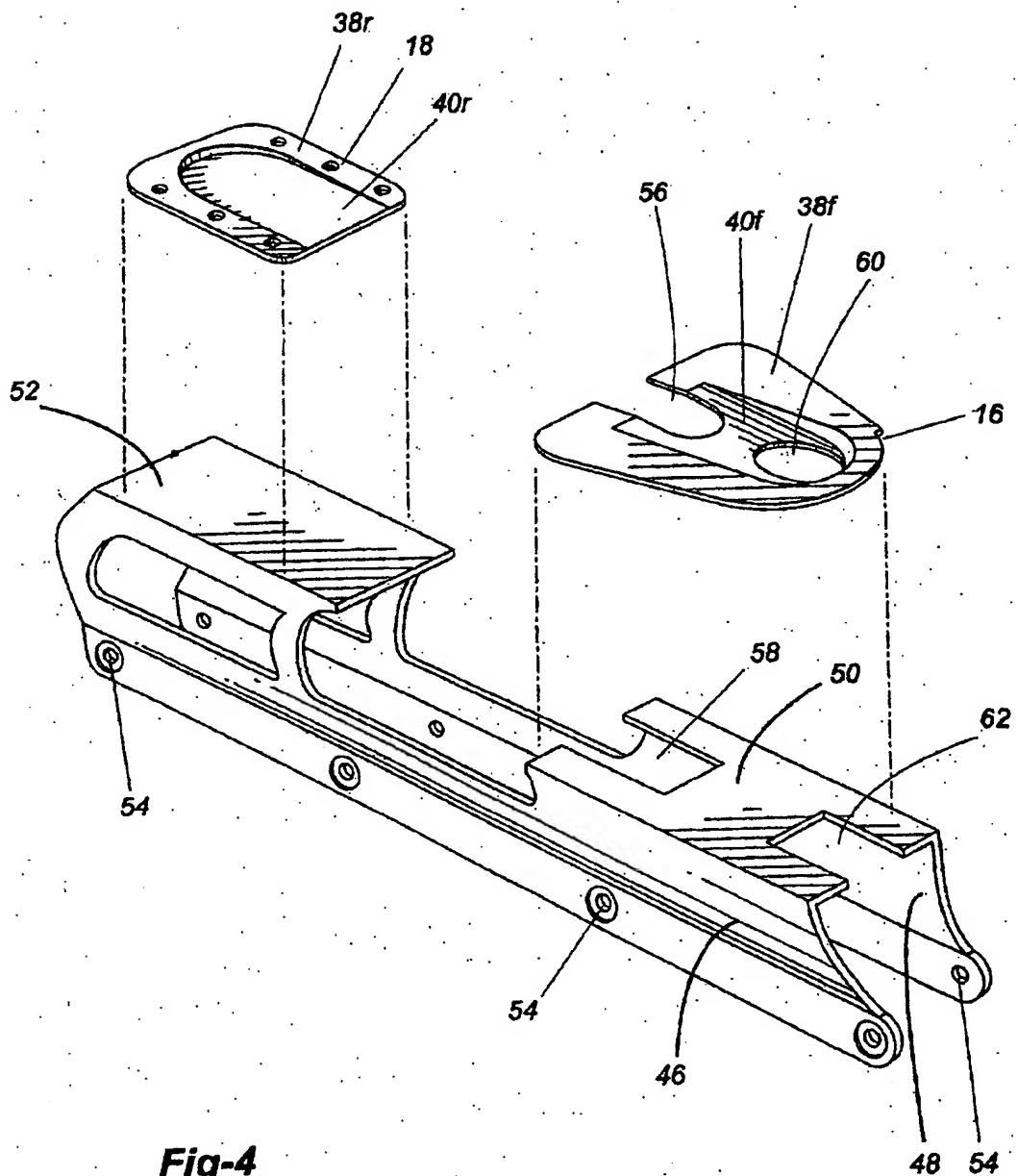
25 3. An in-line roller skate as defined in claim 2 wherein said longitudinal recess is a first longitudinal recess, said bridging portion of said frame further including a second longitudinal recess registering with the forward most wheel.

4. An in-line roller skate as defined in any one of claims 1 to 3 wherein the second forward most wheel projects through said recess of said sole and said

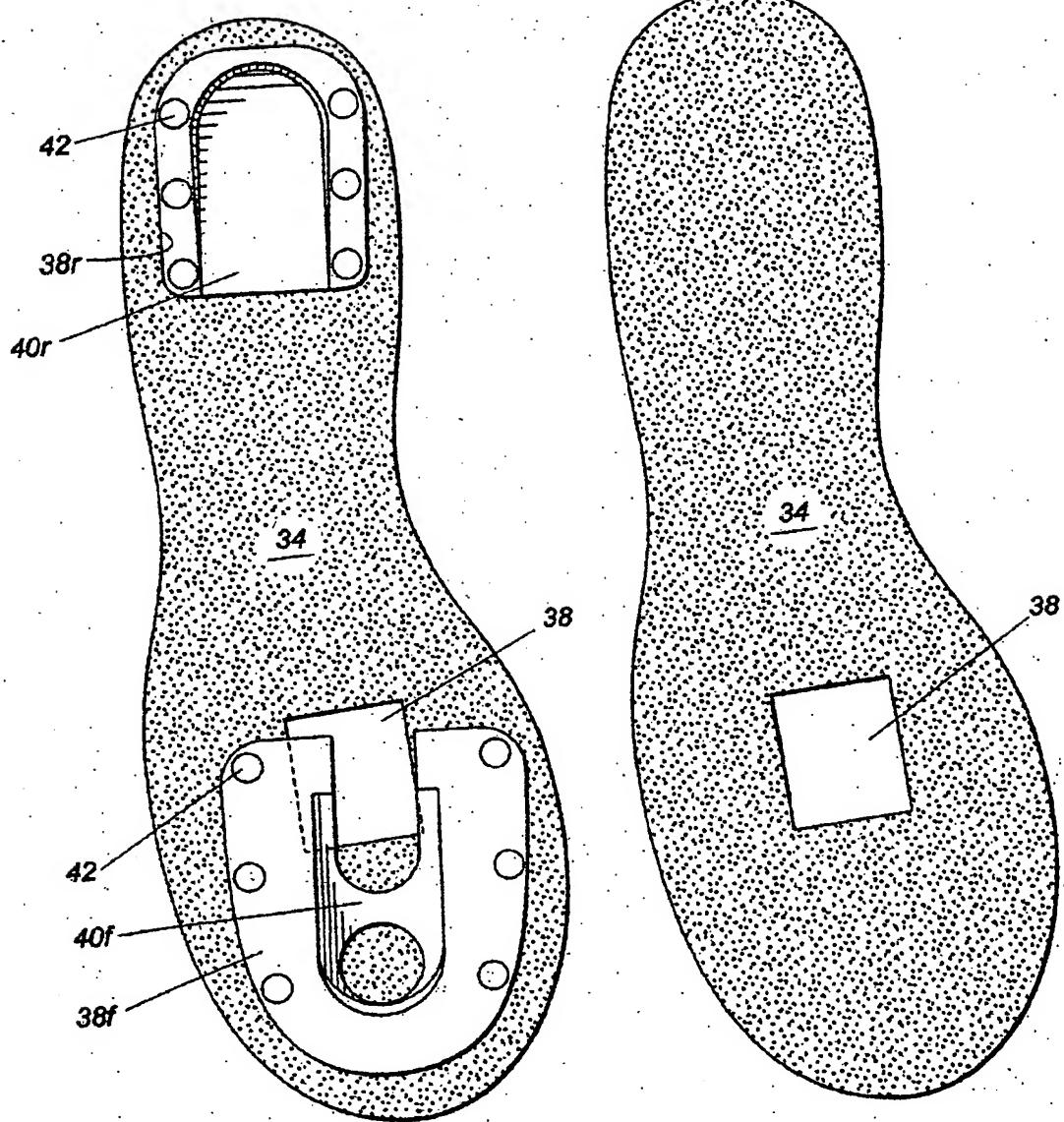
first longitudinal recess and a portion of said wheel extends above said bridging portion.

5. An in-line roller skate as defined in any one of claims 1 to 4 wherein the forward most wheel projects through said second longitudinal recess.
10. An in-line roller skate as defined in any one of claims 1 to 5 further comprising an attachment plate positioned between said bridging portion and a front portion of said sole; said attachment plate including a recess registering with said recess of said sole and said first longitudinal recess.
15. An in-line roller skate as defined in any one of claims 1 to 6 wherein said recess of said attachment plate is a first plate recess, said attachment plate further including a second plate recess registering with said second longitudinal recess.



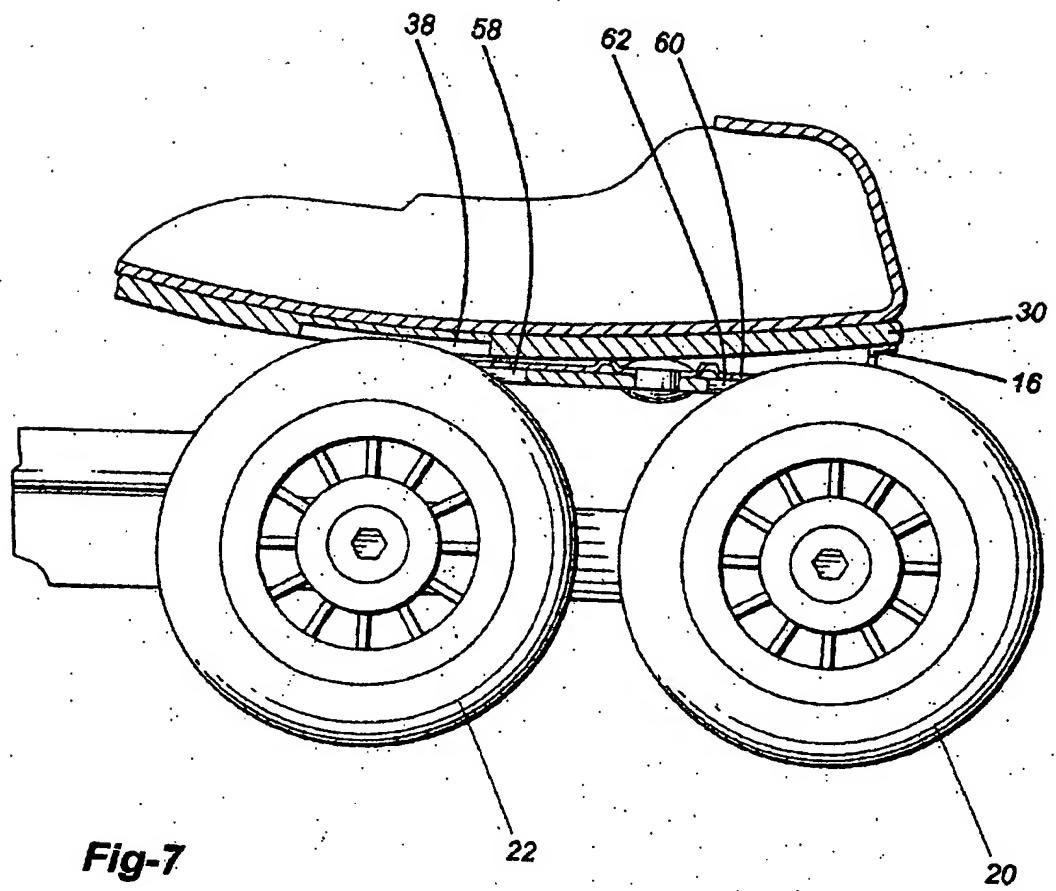


**Fig-4**



**Fig-5**

**Fig-6**



**Fig-7**

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